

PATENT SPECIFICATION

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(54) PACKAGING MACHINE

(71) We, KLEER-VU INDUSTRIES, INC., a corporation incorporated under the laws of the State of New York, United States of America, of 386 Park Avenue South, New York, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the packaging and preserving of materials, and particularly to apparatus and equipment in which the packages are automatically enclosed within a protective shield and sealed in air-tight condition after which the material can be further processed or shipped to a point of distribution.

Heretofore in the packaging industry many efforts have been made to enclose commodities in a polyethylene or other envelope to protect the commodities and to preserve the freshness thereof. This has included packaging machines in which the commodities have been placed between layers of polyethylene or the like, and thereafter the polyethylene has been sealed for protection and preservation. However, the prior art processes and equipment have not been satisfactory since they have involved substantial manual labor in placing the commodities within the envelopes and handling envelopes after they have been sealed. Also the heat seals have not always been satisfactory due to varying conditions, such as the seals not being hot enough, motion between the sheets of polyethylene during the sealing processes and for other reasons the seals have not held or have had ragged, burned edges.

It is an object of the present invention to provide a packaging machine by which the above disadvantages are overcome or at least substantially reduced.

According to the present invention there is provided a packaging machine for automatically enclosing and sealing packages within an envelope of heat sealed material comprising a housing, an endless package conveyor on said housing, a roll of heat sealable material mount-

ed on said housing, means for folding said material substantially in half, an ultrasonic sealer for sealing together the edges of said folded material opposite to said fold in a continuous process, an end sealer mechanism mounted on said housing including spaced pairs of endless conveyors, a plurality of sealer bars interconnecting the conveyors of each pair, a heating wire carried by each of said bars, means for intermittently applying electrical energy to said heating wire and means for moving the sealer bars of one conveyor into substantially meshing engagement with the sealer bars of the other conveyor, whereby said sealer bars will pull the folded material through the machine and said heating wire will seal said folded material at one or each end of the package and sever such web into envelopes.

In a preferred form of the present invention materials may be placed automatically between sheets of heat sealable material which is thereafter sealed to form an envelope, whereupon the material and envelope are discharged from the machine.

In another preferred form of the present invention articles may be placed within a folded strip of heat sealable material at least one edge of which is sealed ultrasonically and thereafter the remaining open end is automatically heat sealed, whereupon the articles are discharged from the machine.

The following advantages of ultrasonic sealing are accomplished with the present invention: there is no oxidized build-up or packaging film on tool or anvil and the seal is not affected by variations of film thickness as in heat sealing which causes inconsistent heat sealing. In addition, there is provided satisfactory continuous film sealing and severing of the selvage, and no puckering or drawback of heat shrink materials takes place. Heat shrinkable materials of various types such as polyvinylchloride may be used.

Further advantages provide improved effluents and arrangements thereof in a device of the character described that is economical

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to produce, durable in form, and conducive to the most economical use of materials and uniformity of members formed therefrom.

A constructional form of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a top plan view illustrating one component of the present invention;

Fig. 2 is a side elevation thereof;

Fig. 3 an enlarged section on the line 3—3 of Fig. 1;

Fig. 4 an enlarged side elevation of the ultrasonic sealer;

Fig. 5 a fragmentary front elevation thereof;

Fig. 6 an enlarged vertical section on the line 6—6 of Fig. 1;

Fig. 7 a section on the line 7—7 of Fig. 6; and

Fig. 8 an enlarged fragmentary side elevation of one of the sealing bars with portions broken away for clarity; and

Fig. 9 a section on the line 9—9 of Fig. 8.

With continued reference to the drawings, a housing 10 is provided supported by posts or legs 11 and, if desired, such housing may have an outwardly extending table 12 on one side thereof. The table 12 is provided with an upper surface 13 having a slot 14 disposed substantially along the longitudinal center line thereof. An endless conveyor 15 is adapted to have its upper run disposed within the slot 14 and such conveyor is adapted to be operated in any conventional manner such as by a motor (not shown). The conveyor has a series of upstanding lugs 16 spaced apart a predetermined distance along the length thereof so that packages or other articles 17 placed on the upper surface 13 will be engaged by the lugs and moved from left to right as seen in Fig. 1.

A platform 18 is mounted on the housing 10 and such platform is provided with an upstanding spindle 19 on which a roll 20 of polyethylene sheet material or the like can be placed. The roll 20 is adapted to be rotatably mounted so that a web 21 of material can be continuously pulled from the roll and passed through a folding guide 22 which folds half of the web to a position overlying the other half. The folding guide is located adjacent to the discharge of the endless conveyor so that articles to be packaged will be discharged onto the web 21 intermediate the two halves and are moved along the top portion of the housing 10 in a manner which will be described later.

An ultrasonic sealer 23 is mounted on the upper portion of the housing 10 and is provided with energy from an ultrasonic generator 24 carried within such housing 10 under the influence of controls 25. The web 21 passes between an anvil 26 and an ultrasonic sealing tool 27 in a continuous process which seals the side of the web opposite the fold and, if

desired, will sever and remove excess material. The spacing between the anvil 26 and the tool 27 can be adjustably controlled by a mechanism 28 depending upon the thickness of material of the web 21.

After the web has been sealed along one edge, the web with the package 17 is fed into an end sealer mechanism 30 which serves to provide a seal transversely of the longitudinally formed web at each end of the package 17. The end sealer mechanism includes upper and lower housings 31 and 32, respectively, connected by spacers 33. The upper housing 31 includes side members 34 connected by a plurality of braces 35 intermediate the ends thereof while the lower housing includes side members 36 connected by braces 37 in a similar manner. Each of the housings is provided with a drive shaft 38 at one end and a driven shaft 39 at the opposite end. The drive shafts 38 are driven in any desired manner (not shown) so that such shafts rotate in opposite directions. Each of the shafts is provided with a sprocket 40 located adjacent to the side members 34 and 36 and the sprockets of the upper housing are adapted to drive a pair of endless conveyors 41 and the sprockets of the lower housing are adapted to drive a pair of endless conveyors 42. Each pair of conveyors are connected by a plurality of sealer bars 43 with the sealer bars of the upper conveyor having a serrated surface 44 which cooperatively meshes with a serrated surface 45 of the lower sealer bars. The bars are arranged on the conveyors so that when they pass through the central portion of the end sealer mechanism, such bars will be in an opposed relation with each other and the serrated surfaces will be substantially meshed with two thicknesses of the web 21 therebetween.

In order to move the bars 43 into cooperating relation with each other, each of the bars is provided with a pair of rollers 46, one on each end, which will engage cam plates 47 and 48 carried by the upper and lower housings 31 and 32, respectively. The lower cam plates 48 are supported by the braces 37 while the upper cam plates 47 are provided with guide pins 49 slidably received within openings in the braces 35.

Springs 50 are disposed about the guide pins 49 and urge the cam plates 47 downwardly under a predetermined tension. When the bars 43 pass around the sprockets 40, at the driven end of the housings, such bars are spaced a slight distance apart and as the bars progress through the end sealer mechanism the cam plates move the bars into meshing engagement to grip the web 21 to hold the same firmly during the sealing process as well as to pull the entire web back to the roll 20.

Each of the bars 43 is provided with a groove or recess 53 along the length of the serrated surface for the resistance, nickel chrome heating wire 55 mounted thereon. The

heating wire 55 is supplied with electrical energy from a conductor 56 connected to a wiper type contact 57 mounted on each of the bars 43 adjacent each end and such contacts are adapted to engage buss bars 58 located adjacent to the discharge end of the sealer mechanism and supplied with electrical energy from any suitable source (not shown) by means of conduits 59 and 60. With this construction the electrical energy is supplied to the heating wires 55 intermittently to seal and transversely sever the web 21 just prior to the discharge thereof from the machine. The wiper type contacts 57 are in engagement with the buss bars just long enough to heat the wire 55 to the point where it will seal the web 21 and sever an envelope from the web and the remainder of the time the heating wire can cool to preserve the life of the wire as well as to prevent too much heat being applied to the web.

Preferably the sealer bars 43 of each of the conveyors are connected to adjacent sealer bars of the same conveyor by a plurality of springs 61 or other resilient members which will cause the web 21 to conform to the configuration of the package 17 and expel any excess air prior to the sealing of the web towards each end of the package 17.

After the web has been sealed and severed the package is discharged from the end sealer mechanism 30 onto a chute 62 which will discharge the packages from the housings 10 for further processing. As illustrated, the packages are discharged onto an endless conveyor 63 of a shrinking machine 64 which has an oven 65 where the packages are subjected to a source of heat, such as steam or the like, which causes the polyethylene material to shrink into close proximity with the package or other article being processed.

In the operation of the device packages 17 are delivered to one end of the machine and are placed on the conveyor 115 either manually or automatically and such conveyor will move the packages along the upper surface of the table 112 and discharge such packages between a folded web 21. The side of the web opposite the fold is sealed by the ultrasonic sealer 23 and thereafter the web is passed into the end sealer mechanism 30. The end sealer mechanism is provided with a plurality of sealer bars mounted on endless conveyors and such sealer bars grippingly engage the web to move the web through the machine and simultaneously during the last part of the travel through the machine, heating wires carried by the bars 43 are supplied with a source of electrical energy to seal and sever the ends of the web into envelopes each of which contains one of the packages 17.

Various types of heat shrinkable materials, such as poly-vinyl-chloride, can be used with the present invention.

The parts can be made of any suitable material and in different shapes or sizes as desired or required.

WHAT WE CLAIM IS:—

1. A packaging machine for automatically enclosing and sealing packages within an envelope of heat sealed material comprising a housing, an endless package conveyor on said housing, a roll of heat sealable material mounted on said housing, means for folding said material substantially in half, an ultrasonic sealer for sealing together the edges of the said folded material opposite to said fold in a continuous process, an end sealer mechanism mounted on said housing including spaced pairs of endless conveyors, a plurality of sealer bars interconnecting the conveyors of each pair, a heating wire carried by each of said bars, means for intermittently applying electrical energy to said heating wire and means for moving the sealer bars of one conveyor into substantially meshing engagement with the sealer bars of the other conveyor, whereby said sealer bars will pull the folded material through the machine and said heating wire will seal said folded material at one or each end of the package and sever such folded material into envelopes.

2. A machine as claimed in claim 1 wherein the ultrasonic sealer includes an anvil and an ultrasonic sealing tool between which the folded material is arranged to pass during the continuous ultrasonic sealing process.

3. A machine as claimed in claim 2, wherein the ultrasonic sealer includes an adjustable mechanism for adjusting the relative distance between the anvil and sealing tool.

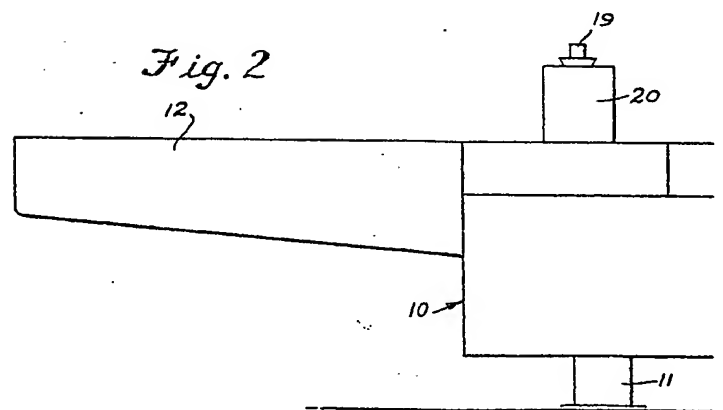
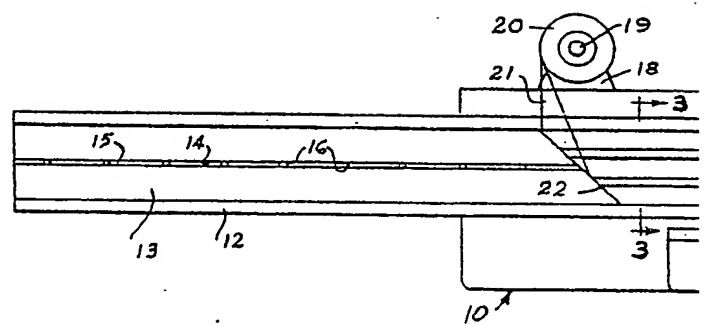
4. A machine as claimed in claim 1, 2 or 3, wherein the end sealer mechanism comprises upper and lower housings, one pair of said endless conveyors being provided in each of said housings, means for driving said conveyors so that the lower run of the upper conveyor is movable in the same direction as the upper run of the lower conveyor and a cam plate carried by each of said housings, said cam plate being adapted to cause the sealer bars of the upper conveyor to substantially engage the sealer bars of the lower conveyor, whereby heat sealable material arranged to pass through said mechanism will be gripped by said bars and thereafter such material will be sealed.

5. A machine as claimed in claim 1 or 2, in which said means for intermittently applying electrical energy includes wiper type contacts carried by each of the sealer bars, and buss bars means carried by each of said housings.

6. A packaging machine substantially as described with reference to, and as illustrated in, the accompanying drawings.

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Sheet 1

Fig. 1

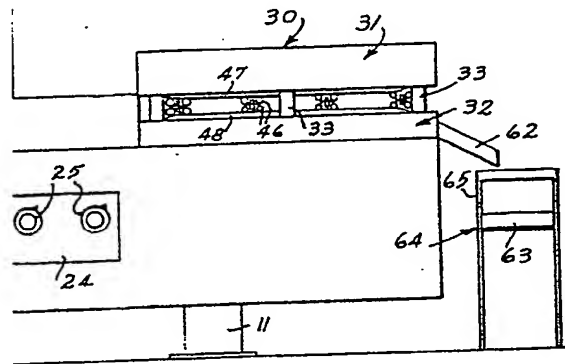
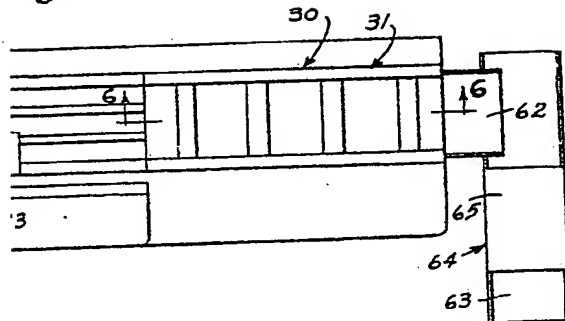


Fig. 3

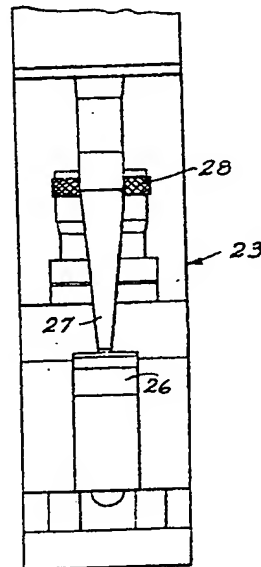
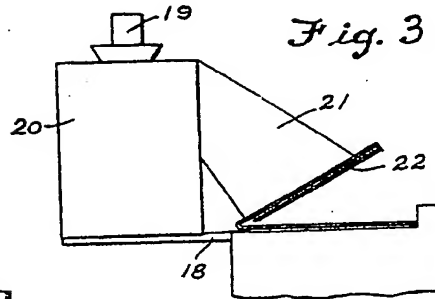


Fig. 5

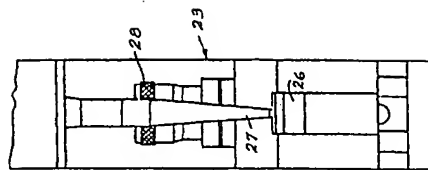
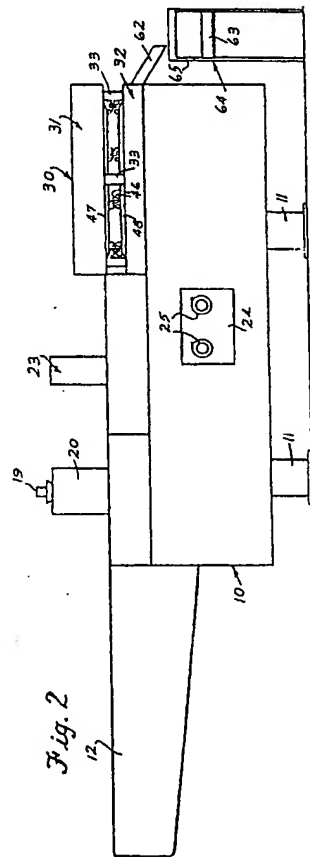
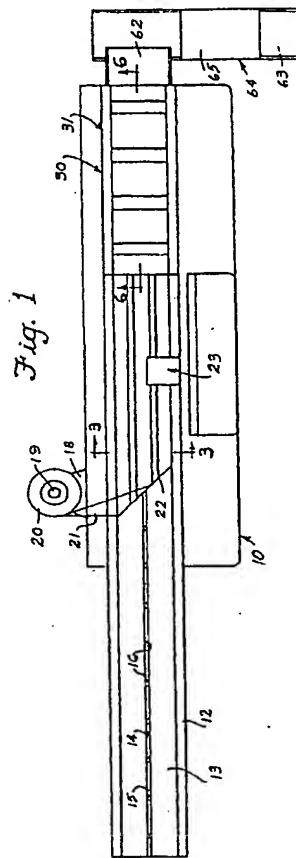
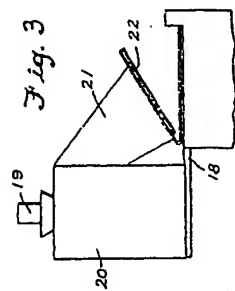


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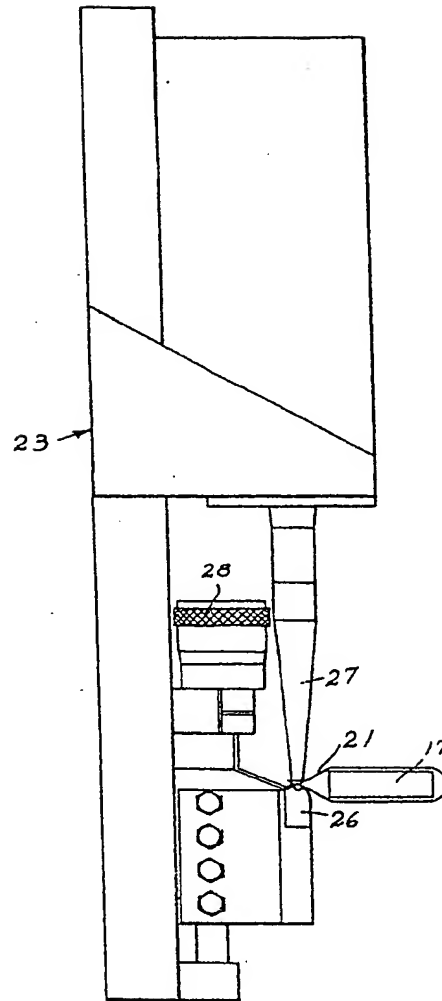
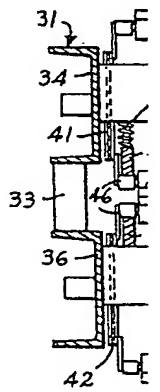
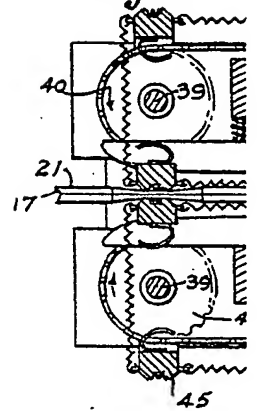


Fig. 6



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2 SHEETS

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Sheet 2

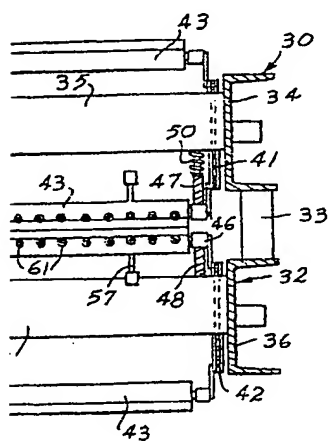
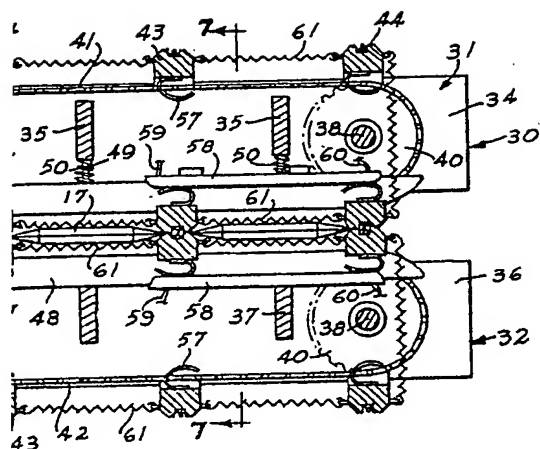


Fig. 7

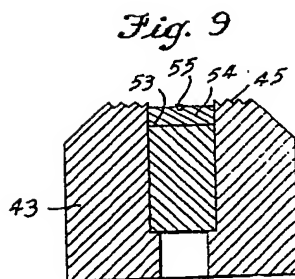


Fig. 9

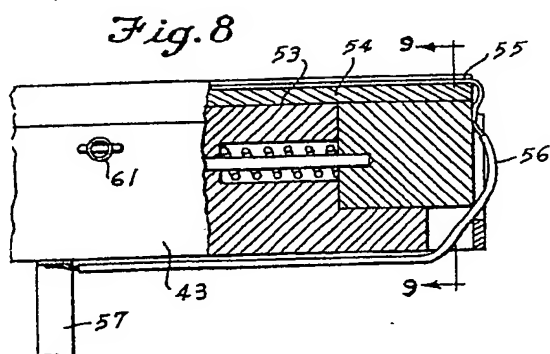


Fig. 8

Fig. 4

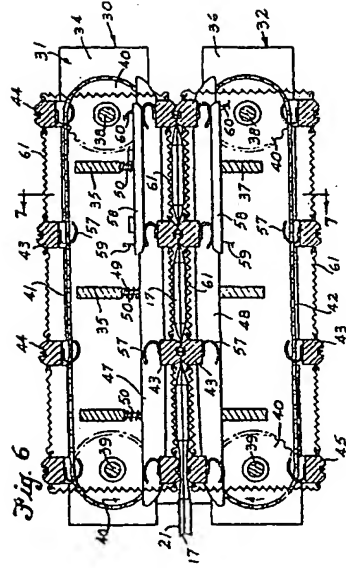
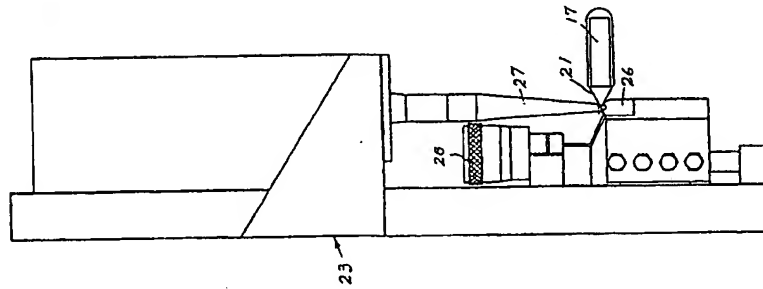


Fig. 9

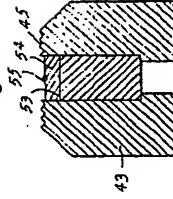


Fig. 7

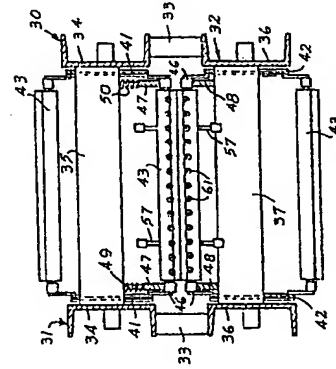
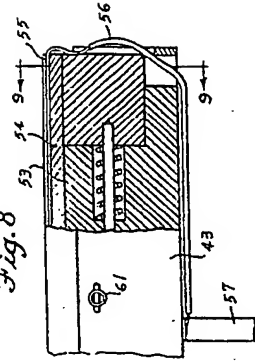


Fig. 8



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